

Modern Ecological Wine Grape Production in South Africa

Presented by

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"To anyone who knows a writer, never underestimate the power of your encouragement"
Matthew Reilly

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1. Introduction

“Treat the earth well.

It was not given to you by your parents.

It was loaned to you by your children.”

Kenyan Proverb

The South African Constitution states: “Every person has the right to an environment which is not harmful to his/her well-being, and to the conservation of the environment for current and future generations” (Act 108 of 1996, Article 24).

Wine grape producers operate in extremely competitive markets. The modern consumer is increasingly more educated and aware of wider social issues, such as the environment and its protection. There is increasing demand for the wine industry to be ecologically accountable to customers, consumers, legislators, employees, shareholders, investors and environmental groups.

The result has been an upsurge in environmental legislation worldwide, obliging producers to comply to some extent, not only for advantageous marketing attributes, but to ensure the sustainable development of the industry into the future. Sustainability is a major challenge for agriculture in the world of today, particularly for wine where *terroir*¹ plays such a pivotal role.

Organic and biodynamic viticultural philosophies as well as effective Environmental Management Systems (EMS) should reduce the wine producer’s impact on the environment enhancing sustainability of the vineyards, improving operational efficiency, identifying opportunities for cost savings and minimalising environmental liability. The approach of ‘prevention rather than cure’ should be of considerable economic value, reducing the costs of environmental management in the long term.

This seminar explores some of the eco-friendly viticultural philosophies, concepts, systems and techniques in South Africa, and aims to provide a critical analysis of these practices.

¹ *Terroir*, as described by *The Oxford Companion to Wine*, is the total natural environment of any viticultural sight, incorporating soil, climate, topography, temperature, rainfall, geology etc. Central to the concept of *terroir* is the notion that all of its elements are natural and cannot be controlled by man, or management.

2. Legislation involved in wine grape production in South Africa

*Plans to protect air and water,
wilderness and wildlife
are in fact plans to protect man*

Stuart Udall

First and foremost, it is the obligation of every South African farmer to adhere to and operate within the framework of government environmental legislation. These are the primary regulations within which any viticultural philosophy, methodology or Environmental Management System (EMS) must operate.

Van Schoor(2003) makes the point that it is the interest of producers to fully acquaint themselves with the relevant environmental law in order to minimise their risk of liability that may result in fines, imprisonment or even interdicts to cease production.

According to Hayward & Trerise(2001), the South African government has kept abreast of the rest of the world in the implementation of stringent legislation regulating the use of natural resources and preservation of the environment.

The main South African Legislative Acts, Ordinances and subsections of particular relevance to viticultural operations is summarised as follows:

a) **The Constitution of the Republic of South Africa, Act 108 of 1996**

Section 24 of the Bill of Rights in the constitution states that:

“everyone has the right to an environment that is not harmful to their health and well being and to have the environment protected for the benefit of future generations through reasonable legislative and other measurements that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable social development.”

This right is thus protected by the provision of adequate and effective legislation that regulates the impact of activities on all natural resources including air, water, soil and the ecological and social environment (Hayward & Trerise, 2001).

b) **The Environment Conservation Act, No. 73 of 1989**

Article 21 of this Act identifies viticultural cultivation as having the potential to negatively impact the natural environment. The unique environmental risk factors of a particular producer should be identified by means of an environmental impact study.

Article 20 of the Act further defines and regulates the prevention of waste and litter and controls waste disposal sites.

c) The Conservation of Agricultural Resources Act, No. 43 of 1983

The use and protection of cultivated land, wetlands and vegetation is detailed under this Act, dealing with soil erosion and pollution as well as regulations for the control of weeds and invader plants and use of weed killers and herbicides.

Prevention and control of veld-fires is also encompassed in the Act.

d) The Atmospheric Pollution Prevention Act, No. 45 of 1965

Harmful or odorous emissions, including dust in the cultivation of soil, are regulated under this Act.

e) The Agricultural Remedies and Stock Remedies Act, No. 36 of 1947

Only registered products for fertilisation, weed, pest and disease control may be used and handled according to stipulations in this Act.

f) The National Monuments Act, No. 28 of 1969

Archeological discoveries, gravesites and antiquities are protected under this act and may not be removed or moved without permission.

g) The Occupational Health and Safety Act, No. 85 of 1993

Provides regulations for the protection of employees from exposure to hazardous chemical substances stipulating the use of protective clothing and training in dealing with such agricultural chemicals.

h) The National Environmental Management Act, No. 107 of 1998

This legislation has a significant impact on the legal liability and accountability of industry, related to the consequences of their environmental behaviour.

Under this Act producers and their employees are obliged to implement the best possible practical environmental management and control systems to prevent pollution and degradation of the environment, or face the full weight of the law.

This law “provides a paradigm shift in the approach of environmental legislation, from a reactive policing system to a pro-active management system” (Hayward & Trerise, 2001).

i) The National Veld and Forest Fire Act, No. 101 of 1998

Vineyards in close proximity to natural vegetation, mountainous areas and adjacent to other producers have come under real threat or damage by fire in recent years. Prevention and control of fires is dealt with in this Act by the provision of information through Fire Protection Agencies (FPAs). Registration with a FPA benefits the producer, as they cannot be regarded as negligent if FPA guidelines have been implemented. This has significant implications regarding liability, damage and insurance costs (van Schoor, 2003).

j) The Cape Nature and Environmental Conservation Ordinance, No. 19 of 1974

Natural fauna and flora declared endangered or protected species are conserved under this Ordinance and may not be tampered with in any way without a permit.

k) The National Water Act, No. 36 of 1998

The public ownership of water is defined under this Act, and simply stated implies that there cannot be any private ownership of water. Only the right to use the water can be acquired (Hayward & Trerise, 2001).

In terms of Article 39 of the Act, limits and conditions are stipulated where a water user receives general authorisation to use water without applying for a license. Any water user whether natural water or wastewater must first register as a user, and may not require a license if in compliance with the conditions as contained in the general authorisation of Article 39. The granting of a water license when required depends on the farmer's motivation to the responsible authority and implementation of a responsible water management programme (van Schoor, 2003).

The right to use of water is regulated in this Act and of specific concern to the wine grape farmer are the regulations pertaining to:

- Abstraction and storage of water
- Irrigation with any wastewater
- Discharging of purified wastewater in a water resource
- Disposal and storing of wastewater
- Erection and maintenance of dams
- Pollution of water and penalties

Furthermore, under the Act, altering the beds, banks and course or characteristics of a watercourse may not be done without a license (Article 21), even if the watercourse is erratic (Article 1).

No water may be wasted, even if the owner has a license.

3. Organic wine production

*“The care of the earth is our most ancient and most worthy,
and after all most pleasing responsibility.*

To cherish what remains of it and to foster its renewal is our only hope”

Wendall Berry

3.1 What is organic agriculture?

The international agricultural organic movement:

The International Federation of Organic Agricultural Movements (IFOAM)² includes “all agricultural systems that promote environmentally, socially and economically sound production of food and fibres. These systems take local soil fertility as a key to successful production. By respecting the natural capacity of plants, animals and the landscape, it aims to optimise quality in all aspects of agriculture and the environment. Organic agriculture dramatically reduces external inputs by refraining from the use of chemo-synthetic fertilizers, pesticides and pharmaceuticals. Instead it allows the powerful laws of nature to increase both agricultural yields and disease resistance” (IFOAM, undated).

The South African Government:

In the second draft of the regulations regarding control over the sale of organically produced products in the Republic of South Africa (Act No. 119 of 1990) published in October 2001, the National Department of Agriculture defines organic (in an agricultural context) as “produce produced by the specific management practices indicated in the regulations, which take care of the environment and soil, and synthetic chemicals (including pesticides and fertilizers) are not permitted other than those allowed.”

The viticultural perspective:

Organic viticulture as described by *The Oxford Companion to Wine* is “a system of grape growing which is based not on the plant but on an attempt at rational management of the living parts of the soil – regarded as a complex, living environment interacting closely with the flora and fauna which inhabit it – while respecting biological cycles and the environment” (Smart & Williams, 1994:694).

The Certification Body:

In their Organic Production Standard (2003), Netherlands-based Certification body, Société Générale de Surveillance (SGS) considers organic agricultural practices as holistic

² IFOAM is the recognised international organisation that represents the worldwide movement of organic agricultural bodies providing a platform for global exchange and cooperation

management systems that promote sustainable production of food of optimum quality and quantity.

Under SGS requirements, the basic broad characteristics related to organic viticultural systems include:

- Encouragement of biological cycles involving micro-organisms, soil fauna and plants
- Sustainable production methods
- Extensive and rational use of manure and vegetable wastes
- Use of appropriate cultivation techniques
- Prohibition of agro-chemicals

In reality, the definition of what constitutes organic agriculture is a complex and controversial matter. There still remains much discord and general confusion between governments, certification bodies and organic movements on the finer points that constitute organic viticulture and agriculture in general.

There are however basic principles that unite these approaches in a viticultural context. Of primary concern is the promotion and maintenance of healthy soil, with an objective to increase microbial activity whilst abstaining from additions of any synthetic substances. The related ideal of protecting the natural environment by preventing soil erosion and pollution of water by chemicals not only protects the environment, but also promotes sustainability and ultimately the unique expression of *terroir* (Robinson, Smart & Williams, 1999).

3.2 An international perspective on organic viticulture

The 1970s saw a return to age-old methods of farming in Europe. This often incorporated organic principles that were quite natural before the explosion of the agrochemical industry after the Second World War. This move to organic farming practices was prompted mostly by a genuine concern for the environment, but was regarded the domain of the philosophical and not commercial.

Although organic viticulture became increasingly popular in Europe in the 1980s, it was not until the 1990s that organic wine producers were being taken seriously. Food scares such as BSE and genetic modification of foodstuffs, created consumer concern in the late 1980s and early 1990s. By 1992, more than 400 producers had been certified with many vineyards estimated to be 'in conversion' or practicing organic methods without official certification (Robinson & Williams, 1999).

Today, organic management of vineyards is widespread throughout the wine growing regions of Europe. (see Appendix A)

The investment and interest in organic wine grape production in France is considerable from a world perspective. According to Rosseau (1999), the total area dedicated to organic vines increased 30% between 1997 and 1998 alone.

Many of the established wine producers, such as Château Margaux use viticultural practices that closely resemble organic principles within the AOC³ regulations and dismiss formal organic certification as irrelevant. There are the famous few, such as Jean-Michel Deiss of Alsace, Chapoutier of the Rhône and Anne-Claude Lafflaive of Burgundy who advocate organic practices as the only route to sustainability and true expression of *terroir*. The most suitable areas are situated in the warm, dry climate of the southern appellations.

The German consumer is perhaps one of the most ecologically aware, and organic viticulture is rife. In a paper prepared for *Biobacchus* International Organic Wine Conference in May 2001, Köpfer & Willer report that in the year 2000, 1391 hectares of wine grapes were managed organically by 358 organically certified growers. This made up 1.3% of the total area under vine.

The last decade has seen a marked increase in organic farming in Italy. Concerted industry encouragement to become more environmentally aware has seen the number of organic wine producers increase by an estimated 300% in the last five years alone making Italy one of the biggest organic wine producers in Europe.

³ **AOC** is France's '*Appellation d'Origine Contrôlée*' system which controls geographically designated areas in specific terms covering permitted viticultural and vinicultural practices.

The move to organic wine production in the USA wine-growing regions has been slower than Europe. In an article by Furer (2002) it was estimated that California had 30 000ha of wine grapes under organic cultivation. Recognised as the pioneers of ecologically sound viticulture, Mendocino has the highest certified acreage of organic vines with 4000 acres, followed by Napa with 1200 acres and 500 acres in Sanoma county. Organics on a large commercial scale is evident in California with Fetzer Vineyards being one of the first major wineries to make a full commitment to organic viticulture in the late 1980s with their Bonterra wines.

The New World wine producing countries have only recently adopted the organic principle on any notable scale, even though the climate in wine growing regions of countries like Australia and Chile are conducive to these practices.

An article in *The Australian & New Zealand Grapegrower & Winemaker* (2002) observes: “until recently, organic wine producers in Australia were very few, on a relatively small scale, driven by ideology rather than the market. Although there is still concern for the environment and consumer health, market forces in the form of consumer demand for chemical free wine are entering strongly into the equation. Demand for organic wine is growing especially in export markets. However this is only the case when the quality of the organic wine is at least as good as conventional wines. At present organic wine makes up around two to three percent of production [*in Australia*], but the demand is growing rapidly, especially in the United Kingdom⁴.”

In a supplement dedicated to Chile in *UK Wine* magazine, Susan Low (2003) reports that Chile has seen something of an organic boom in recent years. Wine producers have begun to realize the potential for organic cultivation presented by the perfect geographical, physical and climatic conditions in Chile, and the need to sustain what is considered a viticultural paradise.

Eduardo Chadwick, president of Errázuriz⁵ is quoted in the article as saying, “One of Chile’s biggest opportunities is to become a center of excellence for organic and environmentally friendly viticulture for the world. The potential is within our ideal soil and climate conditions.” Low goes on to note that it is commonly understood amongst producers that organic

⁴ **The UK market** for organic beers, wines and spirits is undergoing a period of consolidation, according to figures released by Taylor Nelson Sofres. The market for organic beers, wines and spirits was worth £20.4 million in the 52 weeks to July 2003, up on the previous year’s figure of £18.8 million. The organic beers, wines and spirits sector is out-performing the organic market as a whole, which rose 7% over the same period. Growth in organic beers, wines and spirits has slowed considerably on 2001-2002, when sales rose 41%. In volume terms, organic wine sales in the UK amounted to around 118 million cases (Harpers, 2003).

viticulture is not only good in itself, but it is also good for the image of Chilean wine on the whole.

A host of certifying bodies with varying approaches in varying extremes are responsible for administering and regulating organic wine production around the world. Requirements differ from country to country within the framework of their legislation, and with different certifying bodies and certification standards being recognised and accepted as a pre-requisite to export and market products as organic.

⁵ **Errázuriz** is a major wine producer in Chile.

3.3 The situation in South Africa

Organic wine production is fragmented and essentially in its infancy in South Africa. In an article in Wine International (2003), Monty Waldin suggests that years of political isolation contributed to the slow development of organic viticulture, despite favourable climatic conditions. The last few years, however has seen some action with pioneering producers converting either parts or entire crops to organic farming methods.

This increase in organic farming is primarily motivated by environmental concern. Many of the leading players in the industry have considered this philosophy as they realise the need to improve and sustain their soil in the long term. South Africa is fortunate that serious environmental damage such as soil sterilisation, pollution and waste management issues caused by intensive farming have not affected their vineyards to worrying extents yet.

Growing international demand for these wines also plays an important role. Consumer demand on the local market remains marginal, with organic wines remaining a curiosity more than an informed choice. The average South African consumer is more price-sensitive than ecologically aware (Carrie Adams, personal communication, January 2004).

Jeremy Borg, marketing manager for Fairview and Spice Route says "The market in South Africa is very small, and if one approaches this from purely a financial angle, the scope is limited. The market for organics in general is growing all over the world, however there appears to be little desire by the consumer to pay more for organic wines than conventional ones of a similar quality" (personal communication, January 2004).

Pieter Raath, former senior researcher with ARC Infruitec-Nietvoorbij, in Stellenbosch notes, "It is interesting to see it is no longer considered a quirky hippie thing, where people on the fringes of industry are switching over to this way of making wine. The majority of wineries converting vineyards are dynamic mainstream players, driven by market demand." In 2001 he estimated that only a very small component of perhaps five percent of South African wine farmers were considering moving over to organic farming.

Winemaker at Stellar organics, Dudley Wilson believes that there is more interest in growing organic grapes than producing organic wine (personal communication, January 2004).

To date, there are no official statistical records of organic viticulture in South Africa. Michelle du Preez, Marketing Manager for Bon Cap Organics has initiated research into the logistics and statistics in the organic wine scene. The extent of her enquiry covers hectares, varietals, soils, rainfall, dry-land or irrigated, climate, certification, brands etc. South African Wine Information Service (SAWIS) await these findings.

According to Bayly(2000), the estimated area under organic vineyards in South Africa in 2000 was approximately 30 hectares. When last estimated in 2002, the total area under fully organic vine in South Africa had increased to 200 hectares with a possible 600 hectares in conversion.

This upsurge in organic wine production is understandable, given the perfect prevailing climate in many areas of the Cape. Certified organic operations on a larger commercial scale such as African Terrior's Cape Soleil range from Sonop farm in Stellenbosch, Bon Cap Organics in Robertson (see Case Study) and Stellar Organics in the Olifants River have begun to appear with excellent quality debut wines.

As the interest and investment in organic viticulture gradually increases, local organic associations and support groups such as the Organic Agricultural Association of South Africa (OAASA) and the recently defunct Cape Organic Producers Association (COPA) have provided a valuable platform for sharing new understanding of organic intrinsics specific to South Africa and lobbying the organic ideal. COPA was formed in November 2000 and originally constituted 8 farmers from diversified agricultural operations. According to Michelle du Preez, the members drew much insight and knowledge through shared experiences on broad organic agricultural issues initially. Unfortunately the lack of funding for research and specificity of requirements for each individual operation has rendered the association dormant.(Personal communication, 18 January 2004).

OAASA is a national non-profit body that safeguards organic agricultural principles by disseminating information to the production industry in an effort to increase awareness of sustainable practices through the organic philosophy. (OAASA, undated)

Organic farming is very labour intensive and mostly restricted to small-scale production. Charles Back of Fairview has an interesting outlook on the increased labour demands. He is quoted in Wine International (July 2003:31) as explaining: "Managing vineyards organically means you have to remove excess leaves, shoots and weeds by hand, not using chemicals. So, although organics is labour intensive, it is also a beautiful way to cut unemployment, which is a big problem in South Africa. I want to contribute socially whilst remaining environmentally aware. I plug labour into every activity I do and try to add value to it that way. Hence, the term 'socio-organic' is a better one than just 'organic'."

3.4 Future prospects for organic viticulture in South Africa

Ideally more producers will implement the organic philosophy, not only for the benefits of meeting increasing market demand and to sustain the environment, but because it can be economically viable.

With the foundations of organic wine grape growing established in the well-respected Integrated Production of Wine (IPW) scheme, South African farmers may reap the benefits of organic certification by progressing that little step further⁶.

Dudley Wilson predicts that organic viticulture will be limited to the dry areas if it is to be done on any notable scale. As consumers realise that organic wines are affordable and of good quality, it will be these wines that will sell.

A trend is emerging whereby grapes are grown in climatically suitable areas, then transported to certified cellars for processing (eg: Fairview Goat d’Afrique).

Organic farming requires commitment and exceptional organisation. More training and education of all levels of involved parties will encourage records, research and a better understanding of the organic segment of the South African wine industry.

⁶ The potential of IPW principles as a spring board to organic conversion is further illustrated by a comparison between organic and IPW viticultural methods in Section 5.6 (pg 53).

3.5 Case Study

3.5.1 Bon Cap Organic Winery

Bon Cap Organics blazed a trail of glory for Organic wines with their maiden 2002 vintage. A run of awards has placed this exciting new producer on the map as a proud ambassador for South African organic wine.

The family farm and wine-making is in the hands of sixth generation du Preez – Roelf. His wife, Michelle is in charge of marketing. Their passion for their wines and commitment to the organic ethos is infectious.

After a history of delivering their precious grapes to a co-operative system, Roelf was reluctant to continue to throw his top quality, organically cultivated grapes into the voluminous generic wines churned out by the co – operative producers. Considerable investment was channeled into a winery, and once the farm received organic certification, the maiden vintage of the family's own label wines was introduced.

Organic farming is completely natural to Roelf. The farm has been cultivated according to organic principles for generations. "It's simple," he smiles. "What you take out , you have to put back in." He advises farmers interested in converting to organics, to start by "throwing away their spray carts."

The decision to seek certification was not without it's fair share of frustrations.

"When we started organics, not only could we not get textbooks for guidance on how to farm organically, but it was impossible to find organic sprays for the vines too" he says. Undeterred, the couple continued their mission into the muddled South African organic wine scene and have since been recognised as true pioneers.

The meager availability of information has prompted Michelle to dig out facts and figures on the state of the organic industry on her own initiative. Her energy and commitment to organics is admirable. The motivation for organic wine production is motivated by a passion for their land and a vision to pass on a thriving healthy farm to the up-and-coming seventh generation.

Roelf adds that organic status should be secondary to quality. So confident is he in the quality of his wines, that he is completely comfortable entering them alongside conventionally made wines in competitions. Accolades in the form of awards and prestigious listings are proof that organic wine is just as competitive in terms of quality. Hopefully this performance will go a long way in creating increased consumer awareness and overcoming any skepticism.

Unprecedented international interest pre-empted the expansion of the winery to four times its original size. There is hope that success stories like this will convert more South African wine producers and consumers.

3.5.2 Vital statistics

a) Location

Bon Cap Organic winery is situated on the banks of the Breede River in the valley of Eilandia, 25km outside of Robertson.

b) Climate

Situated inland, Bon Cap has a dry climate protected from ocean humidity by a range of mountains. Annual rainfall is 125mm.

c) Soils

Lime rich Terra Rossa and sandy soils predominate

d) Cultivars

98% Red including Pinotage, Shiraz, Cabernet Sauvignon, Merlot, Petit Verdot, Pinot Noir and Touriga Nacional. Small plantings of Viognier.

e) Vineyard area

45ha fully organic grape vines

1 ha organic apricots

4ha organic lucern

f) Certification

SGS SA Org 2001 0074

g) Production

6 500 c/s 100% Red

h) Range of Wines

Bon Cap Organic Pinotage

Bon Cap Organic Syrah

Bon Cap Organic Cabernet Sauvignon

Bon Cap Organic Cabernet Sauvignon/ Syrah

i) Awards

Pinotage 2002	Gold medal at National Young Wine Show 2002
	ABSA Top Ten finalist 2003
	Silver medal at Michaelangelo International awards 2002
	Silver medal at Swiss Air International awards 2002
	Business Class listing on British Airways
Syrah 2002	Gold medal at Michaelangelo International awards 2002

3.6 Quality implications

Quality in wines is not determined only on the cultivation methods of the grapes, but lies to a large extent in the area or origin and the style and technique of the winemaker.

In her article in *Grape*, wine writer Cathy van Zyl (2001) points out that “Organic is not a prescription for quality, only for methodology.” Organic wines should at the very least be comparable in quality to their conventional counterparts. Organic production should never be an excuse for sub-standard quality.

Chris Mullineux, winemaker and viticulturalist at Tulbagh Mountain Vineyards advocates the potential benefits of organic cultivation in achieving unique cultivar character and better expression of *terroir*. In his article in *Grape* (2004:17) he says: ” With all the chemicals pumped onto and into our soils, maybe *terroir* is dead in places. Could it also be a reason why tasting panels today find wines even of different varieties difficult to tell apart? In the romantic world of wine where every bottle of should be an interesting experience, it’s easy to see why many passionate producers are tired of depending on chemicals, and are taking the step back to organics and biodynamics.”

In a tasting of South African organic wines in *Grape*, Tim James (2004) reports a lack of overwhelming enthusiasm for the overall quality reflected in the wines, although shortfalls in winemaking rather than fruit quality was cited for this result. Indeed, tasting panelist Irina von Holdt is quoted as praising the quality of fruit in the wines as “gorgeous and pure.” Relative lack of winemaking experience amongst some of the emerging organic producers who have only recently cut ties with co-operatives was acknowledged as a significant factor. Tim James goes on to note that “There is every reason to believe that as young vines mature and winemakers become more adept, things will improve.”

Jeremy Borg of Fairview reports that comparative tastings on a range of South African organic wines was inconclusive. The area most suited to widespread organic wine production proved to be the Olifants River area where with good organic viticultural practices, phenolic ripeness is at its best (personal communication, January 2004).

Bon Cap organic winery considers the quality of their wines to be as good if not better than conventional wines. They attribute this to the tendency for their organic vines to have more natural resistance in unfavourable weather conditions and occurrence of pest infestation, often performing better in bad vintages than non-organic vines. Bon Cap regularly enter their wines in competitions where they are judged alongside conventional counterparts. Their confidence in the quality of their wines has been rewarded with the awards their wines have won.⁷

The Bon Cap website remarks, “Surprisingly (in the case of organic wine), due to a relative lack of public awareness, this quality does not come at a big premium compared to other products labeled organic these days.”

⁷ **Awards** are listed in section 3.5.2 (pg 19), Bon Cap Organic case study.

3.7 South African legislation and certification authorities

3.7.1 South African legislation

To date there is no enforceable specific legislation governing organic agriculture in South Africa, although Act 36 of 1947 regulates permitted chemicals in wine grape production applicable to all cultivation methods. Wine cannot be certified or sold as 'organic' if any chemicals beyond these regulations have been used.

In his address at an Organic Seminar at Nietvoorbij Campus in May 2002, Neil Erasmus of the South African National Department of Agriculture (NDA) explained that a draft document regulating organically produced products had been drafted in 2000. The draft was based mainly on IFOAM basic principles, but since it is widely written, it is open to different interpretations.

The second draft was published in October 2001. At present, the draft is still under review by the Directorate and it is uncertain when the regulations will be formally tabled under the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990).

The draft is still to be submitted to the World Trade Organisation (WTO) for evaluation and public comment by all WTO countries in order to harmonise standards and eliminate barriers to trade.

According to Neil Erasmus, the NDA has received a request to exclude wine (or certain parts of wine production) from the regulations as the wine industry would like to draft their own more comprehensive legislation specific to organically produced wine. This would be published under the Liquor Products act, 1989.

A workgroup representing the wine industry under the auspices of The Wine and Spirit Board are investigating this matter on behalf of government in an administrative and advisory capacity, and as such are to draw up draft legislation based on international guidelines as well as indicating exactly what part/s should be included or excluded from the regulations related to local and export. At present, the second draft of regulations still cover all agricultural products, including the production of wine grapes.

At the moment, the wine industry is reliant on costly certification by international bodies that differ substantially in requirements and standards. Once South African legislation in place, the parameters will be clearer and costs of certification should be considerably reduced.

3.7.2 Certification Authorities

All organic certification around the world is supported by IFOAM that acts as a global platform for co-operation.

The basic principles laid down by IFOAM and common to all monitoring bodies are:

- improvement and maintenance of soil fertility
- no use of chemically manufactured pesticides or artificial nitrogen fertilizers
- animal welfare is guaranteed

AFRISCO is a South African organic certifying agency that has an interim standard based on the second draft of South African legislation in place, although they have been sub-contracted by European based Ecocert since December 2001 to perform inspections and administration on their behalf and according to their standards. AFRISCO's focus is to develop and support organics, not forgetting small-scale producers, in South Africa and other Southern African countries.

SAWIS have been training inspectors in organic production according to Mossie Mouton of Inspection Services, in anticipation of operating within the framework of local legislation (personal communication, April 2004).

To date, South African producers are reliant on affiliates or branches of international companies such as Ecocert, Skal and Société Générale de Surveillance (SGS) that operate in South Africa.

Each company defines its own framework for minimum organic production standards required for certification. Most of these comply with the EU regulation 2092/92, and as such, are accepted in Europe.

3.7.3 The certification process

Formal certification has valuable marketing implications as it authenticates organic claims on the label of wine.

Recognition of certification differs from one country to another in terms of accepted authorities and their minimum standards. Organic wine producers who wish to export their wine need to ensure that their farm's certification is recognised by the markets they intend trading in.

Raath (2001a) gives the following guidelines:

a) Registering for certification

Once a certification body has been selected, an organic questionnaire and organic production standards document should be requested. Completing the questionnaire and familiarization with the required minimum standards will clarify the extent of the producer's commitment to organic conversion. These documents will also indicate the need for water and soil sampling. It is advisable to undertake the sampling before the registration to pick up any contamination that might prohibit the farm from complying with production standards.

Once the questionnaire examining the producer's specific situation has been completed and submitted, the certification authority provides a proposal laying particulars of the audit process, costs involved and obligations of the applicant.

At this stage, an organic management plan should be drafted to meet the requirements of the audit. This management plan along with soil and water analyses, maps and spraying programs are usually a pre-requisite before registering for organic certification.

b) The inspection visit

The first inspection visit incorporates a thorough audit of vineyards, winery, processing equipment and storage areas, as well as records, bookkeeping, labels and general administration. Key production managers are interviewed and samples taken for residue analysis.

c) Points of attention in vineyard inspections

- cropping plan and rotation; acreage per crop
- A three year recorded history of each vineyard including previous crop and use of fertilizers, herbicides, pesticides and fungicides
- Manuring and storage of manure
- Origin of seed and plant material
- Weed, pest and disease control; also fertilizers and sprays use on conventional vines in the vicinity of those being assessed
- Harvest estimates
- Storage facilities
- Livestock holding on the farm including number of animals, housing and feeding practices)
- Bookkeeping and record keeping of farming processes

Six months after the first inspection, a follow up audit will take place to monitor the farm's progress and corrective action stipulated in the registration audit report. Depending on previous cultivation, the farm may be classified as 'organic in conversion' immediately or after the first year. It generally takes at least another two years before full organic certification is granted.

3.8 Practical principles of organic viticulture

The risk of pests, disease and fungal infection is often the over-riding factor that deters farmers from organic cultivation. Organic philosophies are hinged on prevention rather than cure, making plant protection secondary to the overall health and fertility of the soil and environment.

3.8.1 Soil Management

The fertility and natural revitalisation of the soil forms the basis for organic viticulture. Much of the work in converting from conventional to organic cultivation begins with soil management.

The objective is to create optimal conditions for the microbiological breakdown of organic matter. Fourie & Raath (2001) advocate the following techniques to effectively achieve this aim:

a) *Composting* is an integral part of organic cultivation returning organic matter to the soil.

Organic farmers are encouraged to make their own compost thereby recycling the farm's own organic matter.

- Compost increases the humus⁸ content improving the soil's cation exchange capacity, structure, water retention properties and aeration.
- Compost offers plant protection by improving the vine's Systematically Induced Resistance (SIR) through the enrichment of the soil with microbiologically produced plant growth regulators, vitamins and antibiotics

b) *Cover Crop Rotation* sustains the important top layer of the soil and plays a role in increasing soil fertility as well as promoting biodiversity.

- They protect soil moisture by creating mulch⁹
- They help increase water infiltration
- Dead cover crops return nutrition to soil microbes
- Nitrogen is regularly added to the soil by rotating grains and nitrogen binding legumes

With the approval of the certifying organization, certain fertilizers such as rock phosphate, Gypsum, Magnesium sulphate, Wood-ashes, Potassium sulphate, Calcium chloride, blood and bonemeal may be used as supplementary to organic matter where deficiencies of specific elements occur. External inputs are to be kept to an absolute minimum and only employed if soil analysis indicates deficiencies (Raath, 2001b).

⁸ The **Humus** content of soil reflects the balance between the decomposition of organic material (mineralisation) and the formation of humus (humification)

⁹ **Mulch** is material laid on the surface of the soil benefiting the growth of the vine by retaining soil moisture and hindering the growth of weeds.

Nitrogen deficiencies in the soil can be effectively alleviated by treatment with permitted marine products such as fish and kelp, and by nitrogen binding cover crops as suggested by Raath (2001b).

The labour intensive nature of organic cultivation could create substantial mechanical traffic which can lead to soil compaction. Tractor traffic should be limited and use of implements kept to a minimum to avoid this problem.

3.8.2 Plant Protection

In organic viticulture the outbreak of disease, pests and fungal infections is interpreted as an imbalance in the natural environment. Creating optimal conditions in order for vines to remain healthy and thrive is the objective of any farmer. The organic approach takes preventative measures to ensure the health of the plant thus avoiding infection by suppressing the outbreak before it takes on serious economic proportions.

According to Raath(2001b),increasing the vine's Systemically Induced Resistance (SIR) is the focus for the organic farmer. The SIR of the plant can be boosted by ensuring excellent soil management for optimal plant nutrition and adequate water supply.

In realistic economic terms, there are few farmers who can afford to take the extremist approach and lose an entire harvest to infection.

Methods of rectification in cases of infection by disease or plague are available to the organic farmer in the form of permitted non-chemical remedial sprays and even certain accepted chemical treatments such as low doses of sulphur and copper hydroxide. Controversy surrounds this issue with arguments suggesting that not all permitted organic sprays are completely environmentally safe. Indeed several organic remedies available in South Africa are not registered for wine grapes. The biggest debate surrounds the permitted use of 'Bordeaux mixture', a copper hydroxide solution for the control of downy mildew. Concerns about the potential toxicity to the environment with prolonged use, has led the EU to propose that use of the preparation be phased out by 2010.

The need for preventative spraying is largely dependant on climate, and is done only when absolutely necessary. Although many permissible organic pest and plague control products are available, claiming to prevent and cure any problem that might manifest, the intention of organic cultivation is to use these measures as a last resort. Simply replacing a conventional spray program with organically permissible sprays is not acceptable (Fourie & Raath, 2001).

Insect plagues can be controlled by improvement of biodiversity in order to lure parasitic and predatory insects as well as judicious use of plant oils, bacteria and strongly scented natural plant extracts.

Cultivation of clones and varieties that are well adapted to local prevailing conditions and are comparatively resistant to disease should be selected to negate the threat of disease.

3.8.3 Weed control

Weeds negatively impact the organic vineyard by competing for water and nutrients, promoting pests and diseases and causing difficulties in harvesting.

According to Fourie (2003), there is no registered organic herbicide available for use in wine grape production. Correctly timed mechanical and minimum cultivation techniques are recommended to control weeds in the organic vineyard.

Traditional mechanical weed control such as ploughing and weeding with spades and forks is an effective option within the organic framework although labour intensive. Slashing by machine or manually has the benefit of creating mulch which suppresses further growth by the weeds whilst causing minimum soil disturbance but must be done regularly.

Cover crop cultivation is an important soil management practice and has the added benefit of weed control by way of mulching.

3.9 Economic implications of organic viticulture

One of the major hurdles deterring wine producers from going organic is the perceived higher costs and risks of production. The cost of organic farming is, in fact, not necessarily higher than conventional methods according to Dudley Wilson. Initial costs may be high, but this tapers off after about seven years.

Economic implications in marginal climates can be severe with loss of entire crops. Diligence in pro-active prevention of threats to the harvest through permitted methods is imperative to prevent financial disaster.

Accreditation expenses depend on the certification body chosen to register and monitor the company. On average, it costs R60 000.00 for each new vineyard for certification by an overseas body, and R10 000.00 by a locally based organization. An annual organic certificate must be obtained and costs around R30 000.00 per annum. The producer must also agree to unannounced audits by the certification body at any time, and must cover the costs associated with such an audit.

Brian Pickering, formerly of the now dormant Cape Organic Producer's Association is quoted in an article by Kirkby(2001) as saying "It takes three to four years to convert from standard farming to organic farming, but if done systematically and correctly then it can be affordable. I advise farmers to identify a section of their farm to start, get the process right, then start moving the rest of their farm over."

3.10 Benefits of organic wine farming

a) Protection and sustainability of the environment

The key focus of organic cultivation revolves round this aspect. The effects of adhering to organic principles include prevention of soil erosion and protection of water quality that ensure sustainability of the vineyard into the future.

b) Protection of the health of farm workers

According to Frey Vineyard's website (undated), research by a National Cancer Institute in the USA found that farmers exposed to herbicides had a six times greater risk of contracting cancer than non-farmers. Improved occupational health and safety standards are achieved by minimal or no utilisation of potentially harmful chemicals.

c) Job Creation

Organic farming encourages the use of manual labour in the control of weeds and pests in the vineyard. The increase in labour costs is largely offset by reduction in chemical costs. This creates a unique employment opportunity.

Spice Route's 'socio-organic' scheme where jobs are created by doing all vineyard work and pest control by hand illustrates the potential for employment projects.

d) Promotes biodiversity

Biodiversity can be aesthetically pleasing, but more importantly, it regulates the soil and helps restore the natural ecological balance of the insect population, limiting pest infestation problems. Organic philosophy considers monoculture an unnatural state.

e) Health benefits

It is already widely accepted that organic fruit is higher in vitamin C and essential minerals. The UK soil association claims to have further scientific evidence that organic produce is also higher in phytonutrients which are compounds that protect plants from pests. These are reported to be beneficial in the treatment of cancer.

In addition, organically produced wine addresses increasing consumer concerns about most chemical residues, antibiotics, genetically modified organisms, nitrates and additives all prohibited or avoided in organic practices.

f) Reduced Costs

Specifically costs of chemicals and sprays (area dependant)

g) Marketing Advantages

Organic certification and cultivation undoubtedly has considerable marketing spin-offs. Although a valuable tool, certification does not present a viable selling proposition on its own.

h) Potential Quality

Lower yields, increased resistance to disease and optimal vine nutrition contribute to concentration of phenolics in organic grapes that, if handled correctly, produce wines of character and true expression of *terroir*.

3.11 Disadvantages of organic viticulture

a) Threat of disease

The risk of pests and disease is largely area dependant, creating more of a concern in wet and humid areas. Downy and powdery mildew pose the greatest threat to the vines with entire crops at risk if not managed correctly.

b) Labour Intensive

Abstaining from use of chemicals means that a lot of manual labour is required in the vineyards. This has substantial management and cost implications for the producer.

c) Increased Costs

Set-up costs are high but should taper off after a few years. The increased operating costs can be off-set by savings on chemicals.

d) Certification Audits and Administration

Certification requires systematic management and record-keeping as traceable adherence to the required standard. Audit fees are high.

e) Access to Information

At present the meager information and support available to the organic viticulturalist can cause frustration. Research, facts, figures and statistics are desperately required in order to grow the organic movement in South Africa. Unfortunately, so is funding.

f) Credibility

The discrepancies in regulations and standards and lack of enforceable legislation casts a shadow of doubt on organic certification and leaves it open to abuse and fraudulent claims. Producers and consumers have no real way of telling if what is claimed to be organic has been sufficiently audited and controlled and is in fact genuinely organic.

g) Long term sustainability of organic methods

The sustainability of an organic system in wine grape production still has to be investigated in South African conditions.

h) Market feasibility

To be a viable business operation is all about the bottom line. Given the 'niche' position that organic wine occupies on the local market, motivation and marketing cannot rely on organic status alone. Increased operating costs are not an excuse for premiums without the quality to support the price point. The average consumer in South Africa is far more price sensitive than ecologically aware making it tough to succeed in a competitive marketplace.

i) Contradiction, Ambiguity and Consumer Confusion

Too many systems with too much discrepancy understandably creates confusion in the mind of the consumer. The organic philosophy has become very difficult for the average consumer to confidently believe that what is claimed to be organic is true and of a minimum standard in terms of chemical residues and food safety.

j) Neighbourly concern

In the more densely cultivated areas (such as Stellenbosch) a block of vines bordered by conventionally cultivated grapes could create problems on both sides of the proverbial fence. There is the risk of disease or fungal outbreak attacking the relatively vulnerable organic vines and spreading to the conventional vines on the one hand, and the concern that chemicals from conventional practices drifting and leaching over to the organic block on the other. Ideally, organic vineyards should be surrounded by natural vegetation or in a relatively isolated position for practical peace of mind on both counts.

4. Biodynamic wine production

“In the end, we will conserve only what we love.

We will love only what we understand.

We will understand only what we are taught.”

Baba Dioum

4.1 What is biodynamic viticulture?

The Oxford Companion to Wine describes biodynamic viticulture as: “The most extreme and ideological of all alternative approaches to viticulture, and is heavily influenced by the theories of Rudolph Steiner¹⁰. Biodynamic viticulture emphasizes soil fertility with the added dimensions of the ‘cosmic background’ of astronomy. Thus vineyard operations are governed by the positions of the planets and phases of the moon” (Smart, 1994).

A core element of biodynamics is regarding the farm in its entirety as a self-sustaining living system. The vineyard is considered in the context of a wider pattern of lunar and cosmic rhythms. Biodynamic producers respect the soil as a living entity in its own right and not merely a substrate for vine growth. In this light, biodynamic viticulture is deeply individualistic in keeping with the particular situation and circumstances surrounding the farm (Goode, 2003a).

Biodynamic producers have an altered view of the world on which the agricultural model is built and requires the utmost commitment to the philosophy. There are the extremists who open the subject up to ridicule, but the fundamental principles of biodynamics are in essence, similar to those of organic viticulture.

The use of synthetic fertilizers and pesticides is completely shunned. Instead, homeopathic preparations are applied in keeping with the phases of the planets to enhance the life of the soil. Disease is deemed a symptom of a deeper imbalance within the farm organism. The symptom, rather than the problem is tackled.

¹⁰ **Dr Rudolph Steiner** was an Austrian philosopher and scientist who founded the Anthroposophical movement. It was his life’s mission to reconcile the spiritual and material worlds. Anthroposophy is ‘spiritual science’ and encompasses a profound awareness and utmost respect for the visible and invisible energies that shape human life. This philosophy is the basis of the Waldorf School system that he founded. Biodynamic farming originated from a series of lectures entitled “Spiritual foundations for the renewal of agriculture” delivered a year before his death in 1924 (Demeter, 2003).

For the average rational South African wine drinker, it is the 'cosmic element' that gives biodynamics its cultish image. There is nothing suspect or mystical about following the lunar rhythms – just plain old common sense. The light of the sun, moon, planet and stars reaches plants in regular rhythms. Each contributes to the life, growth and form of the plant. By understanding the effect of each rhythm, farmers can time their soil preparation, planting, cultivating and harvesting to best suit the grapes in his individual situation.

The best definition of biodynamics lies in the origin of the word itself – 'Bio' derives from the Greek 'bios', meaning life, while 'dynamic' derives from the Greek 'dunamis', meaning force. Indeed, harnessing life forces is exactly what the biodynamic wine maker strives for in his wine (Demeter, 2003).

4.2 An international perspective on biodynamic wine farming

There are an increasing number of wine producers around the world who are experimenting with biodynamic viticulture, although it remains on a relatively marginal scale. Goode (2003a) lists selected famous biodynamic certified producers (See Appendix B). The impressive register in France alone reads like a dream wine list, which certainly suggests that there must be positive implications attached to the philosophy.

The infamous quality of biodynamic wines produced by big names such as La Tour Figeac in Bordeaux, Zind Humbrecht in Alsace and Leroy, Leflaive and Domaine de la Romanée Conti in Burgundy as well as several Champagne producers, certainly lends credibility to biodynamic philosophy in France.

France leads the way in this radical approach to viticulture known as *biodynamie*. The most vocal and highly respected producer in France is Nicolas Joly of Coulée de Serrant in the Savennières region of the Loire. It is widely considered that the contemporary biodynamic wine farming movement truly began here.

With 250ha under biodynamic cultivation, Chapoutier in the Rhône valley is the largest biodynamic wine producer in France.

In California, the future of biodynamics looks bright as the number of premium vineyard owners who have started to follow these applied principles continues to grow. In Sonoma, Napa and Mendocino counties, there is nearly 800 acres under biodynamic cultivation. Fetzer is one of the most viable commercial biodynamic operations in the world (Sawyer, 2003).

Alvaro Espinoza, from Viñedos Organicos Emiliana in Chile pioneered biodynamic agriculture in South America. He is currently running a project to convert three farms in the Maipo, Casablanca and Colchagua to fully biodynamic. The total of 240 hectares is still in conversion from organic to biodynamic (Goode, 2003c).

Consumer demand is seemingly irrelevant for the biodynamic producers of the world. Despite considerable premiums charged on biodynamic wine, demand far outstrips supply.

4.3 The situation in South Africa

Biodynamic viticulture in South Africa is done on a miniscule scale only. There are no biodynamic certified producers of wine yet, although the man who first practiced biodynamics in South Africa is aiming to change that situation in the near future. Kurt Amman, owner of Rozendal in Stellenbosch moved over to biodynamics in 2001 and began formal certification of his 7 hectares of vine in 2002.

Johan Reyneke believes that biodynamics presents great opportunities for growth in South Africa: "We will see more biodynamic wines here in future. It is a worldwide trend and we are just a bit slow to catch on here. Besides, it's much more rewarding, with good quality and a great market." Reyneke have 0.5 hectare Pinotage biodynamically cultivated, with plans to convert half of the farm within the next year. The lengthy conversion was in part, due to initial reluctance from financiers. Now that the small-scale experimental vines have proved to be viable in terms of quality and economics, Reyneke has permission to convert more vineyard sites. The farm has been fully organic since 1999 (Personal communication, July 2003).

Another believer in biodynamics is German winemaker and owner of Lemberg farm in Tulbagh, Klaus Schindler. His Phases of the Moon Pinotage is cultivated by biodynamic principles of cosmic timing. "People have been doing it for centuries," says Klaus, "in Europe it is very common for people to either plant vegetable or flower gardens on a waxing or waning moon" (McDonald, 2003).

No factual data or research pertaining to biodynamic viticulture and its extent in South Africa is available. The wine producers who dabble in biodynamics, are mostly in an experimental capacity and on a very small scale.

4.4 Certification

A wine producer who wishes to convert to biodynamic viticulture would be advised to begin by moving to organics first. Nicolas Joly suggests that when you are confident in organic production, then proceeding to biodynamics would require as little as 6 days extra work in the year per 15 hectares of vine. That's the easy part. The difficulty is in making the paradigm switch to this new understanding of nature (Joly, 1999).

Mike Benzinger of Benzinger winery in California observes "These alternative systems are far more information driven systems. You have to know so much more to make the jump from conventional to organic farming and then to biodynamic farming" (Hinkle, 2002).

It takes a fully involved hands-on farmer with true commitment to make a success of biodynamic viticulture. If producers, farmers, winemakers and even labourers do not stay focused on all aspects of the active eco-system, the plan will not work. "A fabulous idea in your mind, but nothing in your glass," warns Joly.

Much like organics, there are no legislation or certification bodies in South Africa. The best known and by far the biggest certification body is Demeter. Demeter is an international organization that was formed in 1928, soon after biodynamic agriculture was conceptualized. Demeter has member organizations that act as certifying agents on all continents including Africa (Demeter, 2003). Demeter certifies all forms of biodynamic agriculture.

A French body called Biodivin concentrate solely on viticulture. Controversy surrounds these rival authorities with Biodivin claiming to represent a purer form of biodynamics and Demeter being accused of not being strict enough. Chapoutier, who is involved with Biodivin is most concerned that under Demeter, assessment audit standards were not as stringent as they should be (Goode, 2003d).

4.4.1 Key criteria for certification as set out by Demeter

- Maintenance of a healthy, diverse ecosystem; an expectation that the farmer supports a broad ecological perspective that includes not only the earth, but also the cosmic influences and rhythms of which the earth is a part.
- Nutrient self-sufficiency, and soil husbandry; use of biodynamic preparations to build soil health through enlivened compost, and to stimulate plant health.
- Integration of livestock with a requirement that at least 80% of livestock feed is from the farm.
- Problem solving within the farm organism
- No use of genetically modified organisms or plant materials

(Demeter, 2003)

4.5 Practical implications of biodynamic viticulture

The full use of biodynamic methods is required for two years before certification. This involves the application of biodynamic preparations (See Appendix C). These preparations are available in South Africa and can be purchased, ready to spray. The small quantities involved means that cost implications are minimal.

It is highly recommended that some livestock be integrated into production as they contribute to the vital life forces within the farm as a self-sustaining individual unit.

Although timing of all processes in line with planetary movements is critical in biodynamic agriculture, it is not a requirement for certification. Timing is open to interpretation by the farmer and is done according to the farm's unique circumstances.

Monty Waldin explains the practical application of the cosmic calendar (Wineanorak, 2003):

“The passage of the moon through the different constellations exerts four distinct elemental influences on the vineyard, namely water, earth, air and fire, which are shown through the roots, fruit and flower.

Water and leaf days

The growth of the leaves is linked with the water signs of Cancer, Scorpio and Pisces. On these days, the farmer will spray silica onto the leaves to promote photosynthesis. Silica acts as a heat reflector and ultimately aids ripening.

Earth and root days

The growth of the roots is linked to the earth signs Taurus, Capricorn and Virgo. Winegrowers should compost in the afternoon on a root day, when the sun is descending and the earth forces are downwards which is where the roots should go.

Air and flower days

The growth of the flowers is linked to the air signs of Gemini, Libra and Aquarius. The wine farmer takes no significant action.

Fire and fruit days

When the moon passes in front of a fire sign, heat and dryness are favoured in the plant. The vine will then respond with fruition. The growth of the fruit is linked to the Fire signs, Aries, Sagittarius and Leo. Fruit days are of great importance to the wine farmer and are the best working days in the vineyard”

4.6 The case for biodynamic wine production

Biodynamic wine is a novelty that most consumers fob off as whimsical – like astrology, they may not believe it, but they will still read their star sign. It is also undeniably holistic and aesthetic, making conventional wines seem sterile and lifeless. “Biodynamic farming promotes a more artistic approach, centered on man and not on industrial notions of economic profit and loss” (Joly, 1999).

Are biodynamic wines really more than rustic curiosities, as perceived by the majority of the market in South Africa?

Biodynamics opens the debate on true expression of terroir. Alvaro Espinoza says “Traditional viticulture artificialises the vineyards, creating an artificial medium. The result is that the wines taste similar to those from other places.” His view is that organic and biodynamic cultivation facilitate site-specific flavours in wine (Goode, 2003c).

Lalou Bize-Leroy concurs: “If you practice biodynamics without cheating – and by that I mean keeping your yields low to respect the needs of the vine, rather than using a banned chemical substance- then the grape is more likely to reflect the terroir and the wine is likely to be more unique and interesting.”

A group of Swiss researchers comparing conventional, organic and biodynamic viticulture in a project lasting 21 years found that while biodynamic farming is slightly lower yields, it showed higher biodiversity and greater numbers of soil microbes, outperforming other viticultural methods across the board.

Wine correspondent, Jamie Goode captures the essence of the biodynamic philosophy after having interviewed Nicolas Joly: “Very quickly, I realised that Joly is taking an approach to agriculture that is at odds with my training as a scientist. He is using an altogether different way of describing natural processes – a picture language that jars alarmingly with western rationalistic worldview. This is more a language of religion than that of the scientifically based viticulture. Yet, at the same time I have immense respect for the vision of viticulture he is expounding. It has a life and vitality of its own, which exposes the intellectual and environmental bankruptcy of chemical-dependant conventional regimes. Above all, he is making profound, interesting wines” (Goode, 2003e).

4.7 A comparison between organic and biodynamic viticulture

Biodynamics could be described as extreme organics. The main point of difference between the two philosophies is in the use of special preparations and the timing of their application.

Nicolas Joly explains the difference as “In biodynamie we are connecting the vine to the frequencies it needs – like tuning a radio, we are tuning the vine to the frequencies that bring it to life. Organics permits nature to do its job; biodynamie permits it to do its job more. It is very simple. The earth is surrounded by energy that participates in life. One can catalyze micro frequencies of energy by means of a natural preparation which acts as a kind of relay, revealing potential” (Goode, 2003e).

If nothing else, biodynamic and organic viticulture stimulates thinking on how to do the best for your vines and the environment now, and for future generations.

5. Integrated Production of Wine (IPW)

“Find your place on the earth.

Dig in, and take responsibility from there. ”

Gary Snyder

5.1 What is the Integrated Production of Wine scheme?

The Integrated Production of Wine (IPW) is a system of sustainable viticultural and vinicultural practices that, if implemented correctly, promotes environmentally friendly and profitable production. Wine producers are encouraged to voluntarily adopt a set of ecologically friendly minimum standards. These standards are unique in that they are applied to every point of processing, from establishing the vineyard through the cellar to packaging (IPW, 2003).

‘Integrated production’ is a concept well known to international agriculture and has been unofficially operational in many South African vineyards for several years before the formalisation of the IPW scheme.

The project is a joint venture between the Agricultural Research Council (ARC) Infruitec – Nietvoorbij and the South African wine industry as a whole within the framework of local legislation. The support and involvement of all major wine industry bodies lends credibility to the scheme.

According to Andries Tromp, convener of the scheme (Tromp, 2003), extensive research carried out by Dr CA de Klerk and his team at ARC Infruitec- Nietvoorbij resulted in the original IPW guidelines being first published in 1993. Having fine-tuned the scheme incorporating the cellar processes and packaging, IPW was legislated on 6 November 1998 under The Liquor Products Act (Act 60 of 1989) and falls under the jurisdiction of the Wine and Spirits Board and the National Department of Agriculture.

By the beginning of 2002, 99% of wine grape production in the Cape fell under the control of the scheme. To date, 68 Co-operatives, 90 Estates, 258 Private cellars, all 7 producing wholesalers and unspecified bottlers are members of the scheme. This comprehensive support of industry lends further credibility to the scheme. Since June 2000, all commercially available wine in South Africa has been encompassed by the IPW scheme.

The IPW scheme is unique in that it is the first environmental management system in the world that provides specifications for the farm and the cellar. It is completely inclusive of every process at every stage of production. Guidelines are given from the preparation of the soils through the wine production in the cellar and even the recycling of packaging materials in the final product. There are additional plans to draw other facets of industry into the scheme, such as suppliers of glass and packaging materials (Tromp, 2003).

5.2 The role of IPW

The IPW scheme emerged out of the need for identification and formalisation of minimum environmental standards in the production of wine in South Africa.

The success of IPW in South Africa has motivated a drive for international adoption of the principles of the scheme. The *Office Internationale de la Vigne du Vin* (OIV)¹¹ has taken the IPW scheme forward for recognition by all member countries as accepted global guidelines.

Convener of the IPW scheme and Chairman of OIV's Oenology Commission, Andries Tromp is quoted in a Wine.co.za news article as saying "We are actively lobbying for the creation of an international system with uniform guidelines for all wine growing countries which can then be extended to embrace winemaking practices too. Currently a few, mainly New World wine making countries are following independent and not necessarily comparable routes to achieve this objective.

Instead of operating in isolation, we can pool research and experience to evolve stronger, better-managed policies. There is no doubt that the rapidly rocketing demands placed on natural resources by growing world markets and agricultural production systems, gives us no option but to protect the environment if we wish to continue producing wine" (De Kock, 2002).

Thal (2002:27) is quoted in *Harpers* as noting:"unlike any other certification body, (*IPW*) can claim to be the route down which an entire industry is heading, instead of just a handful of its more ethical producers.

IPW in South Africa is a sterling example of what can be done when more than just lip service is paid to the idea of making an industry more environmentally friendly."

¹¹ The **OIV** is the International wine office based in Paris, France and incorporates practically all of the world's wine producing countries as well as 85% to 90% of consumer countries under its membership. Governments of 47 countries decide on international vine and wine legislation here, and these decisions are almost always reflected in local legislation of member countries.

5.3 Objectives of IPW

The IPW scheme acknowledges that vineyard monoculture does to an extent interfere with the natural balance of the environment, and primarily aims to ensure the producer's environmental awareness and responsibility.

International promotion and communication of the scheme through world forums like OIV, aims to secure global acceptance of IPW in consumer and producer countries and build the image of South Africa as a wine producer.

IPW is not considered a marketing tool aimed at increasing market share of South African wine, but rather a "threshold to market access" (IPW, 2003).

5.4 Practical application of IPW

According to the Tromp (2003), a testing period for the implementation of the scheme was done in 1999, with many of the farms finding their practices already within the restrictions of the IPW standards. With the required adjustments and formalisation of a traceable self audited management plan, these farms were producing IPW certified wine by the 2000 harvest.

Subscription to the scheme is voluntary although producers are bound to IPW guidelines by law under the Liquor Products Act, Act 60 of 1989. Thus, once accredited as members, the requirements for compliance are enforceable.

Guidelines are updated bi-annually by a committee of industry experts to include any new research and keep up to date with legislation. The increased requirements for management of waste water in compliance with current wastewater and environmental legislation illustrates this requirement. The philosophy of the scheme has no set goals, but rather, strives for the continual evolution of more stringent standards with developments arising out of research and technology and operating experience of the accredited members.

In order to ensure that the scheme is effectively implemented and managed, intensive training programs have been devised for producers and their employees involved at every level. According to Wines of South Africa (WOSA, undated), there are currently 2000 trained IPW certificate holders spread across all sectors of industry. The IPW system has also been incorporated into the formal education syllabus of Oenological and Viticultural degrees at Stellenbosch University and diplomas from Elsenburg Training College. Training forms part of the requirements for compliance.

5.4.1 Implementation and maintenance of IPW

Thal (2002:27) describes IPW as “a system which is a world leader in its practical, thorough and dedicated approach to long term sustainability” The success of the scheme lies in its absolute transparency and absence of discrepancies as to what is or is not IPW wine. Although the guidelines are broad, there is absolute clarity on good and bad practices in terms of sustainability of the environment.

IPW runs on a self-assessment basis. This is considered strength of the system making it easy to implement and control on a wide scale. Administration is via documented records of compliance based on a self-evaluation report.

Viticultural evaluation is based on an easy self-scoring system that lays out the requirements in detailed terms. Chemicals are classified according to a table and colour-coded according to their harmful impact. Timing of chemical application is also taken into consideration in the viticultural evaluation.

Copies of records are checked and kept at the producing farm and by IPW office and can be requested by buyers. The scoring system relating to minimum standards in the vineyard and cellar assesses a wine’s compliance to the scheme. Points are self appointed for each requirement and passed to the next link in the processing chain thereby being audited along the way. It is the responsibility of the final producer of the wine to submit supporting documentation of compliance.

External auditing is carried out in the form of spot checks by ARC Infruitec – Nietvoorbij inspectors on farms and an independent auditor in cellars. Failure to comply with IPW standards results in penalty points which are formally noted at each stage of the process. Batches of grapes or wine incurring more than 50% penalty points are disqualified and may not claim IPW accreditation.

50 random grape samples across viticultural areas are tested by SAWIS annually. These samples are tested for spray residues and pesticides outside the IPW guidelines. This audit acts as a deterrent to farmers who are tempted to exceed withholding periods or to use pesticides prohibited by IPW. According to results of an audit of the system (Tromp & Marais, 2003), no unregistered or disallowed pesticides or residues exceeding the legal limits have been found in grapes analysed in 2002/2003 harvest.

5.4.2 Guidelines for the Vineyard

The IPW guidelines include 15 standards for the vineyard and 13 standards for the cellar. In the viticultural context of this seminar, the guidelines for the vineyard as set out by the IPW scheme are:

a) *Training*

To ensure the effective implementation and maintenance of the scheme, at least one representative in a relevant capacity is required to attend training on the scheme. The training incorporates integrated pest management (IPM)

b) *Farm and vineyard environment*

Propagation of vineyards in place of natural environment must be approved. Preservation of the natural environment and prevention of soil erosion are further requirements.

c) *Soil and Terrain*

Profile studies on soils must be carried out before deciding on soil preparations and suitability for planting of specific varieties. Chemical adjustments must be based on soil analysis.

d) *Cultivars*

Cultivars that are most suitable to the soil, natural environment and that are disease resistant must be selected. Only certified propagation material may be used.

e) *Rootstocks*

The most disease and pest resistant certified rootstocks for the prevailing environment must be used.

f) *Vineyard Layout*

Row direction must be planned to avoid soil erosion and to allow for maximum aeration to reduce incidence of disease.

g) *Cultivation Practices*

Mechanical cultivation must be kept to a minimum. Minimum cultivation by use of cover crops is encouraged. The use of chemical herbicides must be kept to a minimum and only registered herbicides permissible in the IPW program can be used.

h) *Vine Nutrition*

Excessive fertilization is discouraged as it can cause pollution of water and an environment that is susceptible to pests and disease.

Application of fertilizers must be based on soil analysis.

Foliar nutrition must only be used where deficiencies cannot be corrected by normal soil applications.

i) *Irrigation*

Irrigation must be scheduled according to the water properties of the soil and must be based on moisture content measurements.

j) *Pruning and trellising*

Pruning and training must facilitate aeration to prevent susceptibility to disease.

Trellising systems must be able to support vine without causing dense canopies.

k) *Crop and canopy management*

Crop control must be maintained by correct allocation of bearer buds.

Canopy management to prevent density of canopies must be applied.

l) *Growth regulators*

Only authorized growth regulators may be used.

m) *Integrated Pest Management (IPM)*

Every feasible natural method of pest and disease control must be used to minimize the need for chemical control.

Monitoring and control methods with regard to the important pests and diseases are recommended by IPW guidelines.

All pesticides that are registered for wine grape cultivation are graded in four categories depending on their suitability to integrated production. The use of permitted pesticides in judicious quantities incurs less penalty points.

n) *Handling of chemicals*

Chemicals must be stored in a locked allocated area.

Prescribed protective clothing when handling chemicals is required.

o) *Records*

Meticulous record keeping of all processes is vital to the grading of the producer.

5.4.3 Costs

The IPW scheme is funded by the producer members. Annual fees are R 100,00 per farmer. Cellars contribute per tonnage with cellars under 100 tons contributing R100 per year and cellars above 25 000 tons paying R10 000.00 per year.

5.5 Benefits and Shortfalls of IPW

5.5.1 Benefits of IPW

a) Environmental responsibility and sustainability

The minimum standards set out by the IPW scheme ensure environmentally responsible practices encompassing legislative obligations. Integrated production methodology respects the importance of the soil and the need to farm for sustainability in the future, whilst still offering broad enough options to be adaptable to differing requirements of producers.

b) Self-Regulatory System

The self-auditing system allows for swift and comprehensive compliance to the standards across the entire industry from the largest to smallest scale producers. Guidelines are set out in very specific terms making the scheme easy to adapt and implement.

c) Access to information and research

The results of extensive research done by ARC Infruitec – Nietvoorbij have been to the greater good of the industry as a whole saving producers considerable costs.

d) Image South Africa

One of the key objectives of the scheme is to keep South Africa competitive in terms of environmental responsibility. The commitment of the entire industry creates a proactive and cohesive impression.

e) Occupational health and safety

Farm workers benefit by minimal exposure to potentially hazardous chemicals as well as stipulated guidelines for safety in the workplace.

f) Savings in production costs

With the implementation of IPW, producers report substantial savings in costs of production, particularly from reduced utilisation of chemical sprays and lower water usage.

g) Consumer health

Although IPW uses no visible accreditation, such as a logo incorporated for consumer recognition, Andries Tromp believes that with the whole agricultural world moving in the ecologically aware direction, the concept of IPW will be understood and recognised by the wine drinker sooner rather than later. In time and with more exposure to the scheme, consumers will associate integrated methods with a guarantee of environmentally and consumption safe production.

5.5.2 Shortfalls of IPW

Ironically, the self-regulatory nature of the system is almost as big a shortfall as it is a benefit. Detractors argue that the scheme is open to abuse and would happily pay more in order to make the audit process more threatening. Tromp points out “If we did audits for each and every farm, it would be an expense nobody could afford, the consumer included, but what they are losing if they don’t comply is everything – they will not be able to sell their wine. This stops people from transgressing.” (Thal, 2002:27).

Jaco Potgieter, Oenologist for DGB says that a weakness of the scheme as it currently exists is its stand-alone status. Formal accreditation and international recognition as part of a bigger quality control system would hold more weight, especially in the international market (Personal communication, April 2004).

With no formal marketing plan, the technical guarantee that IPW affords in regard to the environment and food safety is communicated to the consumer by word of mouth. Given the largely environmentally apathetic nature of the average South African wine drinker, it is suggested that the scheme might be somewhat idealistic in expecting whether wine is IPW qualified or not to play a role in their purchasing decision. Andries Tromp is quoted as explaining “The public’s guarantee lies in the endorsement of the large buyers – wholesalers and producers – who will not want to compromise the scheme by purchasing products which do not conform to IPW guidelines” (Van Zyl, 2000).

Although easy to implement, trace ability is reliant on thorough record keeping. This implies considerable administrative management and paperwork. This is however no different to any other environmental management system.

5.6 A comparison between organic and IPW

Although organic and Integrated Production of wine intersects at key points, there are fundamental differences in practice and motivation.

The IPW scheme is a system of voluntary guidelines, whilst organic viticulture is more a philosophy of farming. Both respect the environment and recognize the threat that indiscriminate production methods present to the long-term sustainability of the soil. The common goal is to minimize agricultural impact on the natural environment in an economically sustainable manner.

Certain organic practices are achieved under the IPW scheme and vice-versa.

A good example is both encourage the use of cover crops and natural methods for pest and disease control, limiting the need for corrective measures. The reaction to outbreaks of disease and pests is where major points of difference between the two methods occur.

IPW does not permit the use of any agricultural preparation that is not registered under South African agricultural legislation. Certain organic preparations, such as compost teas are not registered for use in wine grape production, and as such are disallowed by the scheme.

The judicious use of approved chemicals is prescribed and allowed by the IPW scheme where organic methods are unable to salvage the situation. This allows the farmer some recourse in crisis harvests that are hit by pests or diseases, whilst any use of chemical pesticides, fungicides or herbicides is forbidden by most organic certification bodies.

Thus it is more likely that an organically certified vineyard complies with IPW requirements than it is for an IPW cultivated grapes to qualify as organic. On a large scale, organic viticulture is more challenging especially in climates prone to infestation and infection. IPW allows for more adaptability in all viticultural climates and circumstances. In the grand scheme of wine production, IPW falls between the extremes of conventional and organic cultivation.

6. Conclusion

“Study nature, love nature, stay close to nature.

It will never fail you.”

Frank Lloyd Wright

Any viticultural philosophy, concept, system or technique must primarily operate within the parameters of South African environmental legislation applicable to the cultivation of wine grapes.

6.1 Organic production of wine grapes

Few tried and tested organic processes have been developed for the South African climate with little technical advice available. Up to now producers have had to adapt overseas practices to their own situation and literally feel their way through the organic maze.

South Africa's main point of weakness is lack of an operational legal framework. It is clearly imperative for South Africa to implement cohesive legislation and develop a local system of agreed minimum organic standards that is economically viable and can be easily audited.

Hard evidence and facts in the guise of research and statistics is lacking in the South African organic wine movement. Education and training will create awareness of the need for research and reports. Consumer education will grow the market.

Consumer confidence can only be achieved if absolute assurance is given that what is claimed to be organic is indeed organic in all respects.

It is unlikely that the organic market will thrive on environmental consciousness on the part of the farmer or the consumer alone. What will determine the growth of organic wine will be quality.

The organic philosophy involves more than just farming. It is about how you see the world. It is our responsibility to future generations.

Michelle du Preez of Bon Cap sums it up by saying “Organic farming is a way of living. It involves a global perspective and passion for sustainability. If farmers 40 years back could farm without chemical fertilizers, pesticides and herbicides, why should it not be possible today? If you sit back and think of the increased degree of chemical products used today compared to then, what would the case be in another 40 years?”

6.2 Biodynamic production of wine grapes

Biodynamic cultivation is still a curiosity in South Africa shrouded in mystery and viewed with a degree of amusement. Consumers are deterred by its extreme esoteric image.

The question arises that if biodynamics is so strange, then why does it appeal to so many great winemakers? It would seem the reason is, whatever the mechanisms or suspicions, biodynamics works. This philosophy is the most likely to deliver grapes with the most authentic expression of *terroir*, and could well provide the antidote to growing global standardisation of wine. Biodynamics promise ultimate sustainability of the vineyard in the long term.

Whilst the biodynamic wine market is gaining momentum in various wine regions of the world, it is still a novelty amongst wine producers and consumers in South Africa, and as such is likely to remain on a small experimental scale.

It is suggested that a scientific interpretation of biodynamics would aid its wider acceptance. According to Michael Chapoutier: “the future of biodynamic wine will be limited only by the ability of the consumer to appreciate complex, sophisticated wine” (Goode 2003f).

6.3 Integrated Production of wine

The IPW scheme is dynamic and effective in making a difference today for sustainability in future by the South African Wine industry in its entirety.

The success of IPW depends on commitment and integrity from the producers. As well as protecting our natural environmental resources, the scheme is of considerable value to the image and reputation of the South African wine industry. The comprehensive support from the producers is encouraging given that the scheme is voluntary, and gives a good indication of the innate environmental awareness and responsibility of the industry as a whole.

Operating within the framework of legislation has contributed to buy-in by wine producers. Accreditation or recognition by a larger international body could empower the scheme as an internationally recognised quality control standard. It is hoped that this ambition will be realised through the OIV, laying foundations for a viable standard for the rest of the world.

The scheme is a valuable reassurance for buyers of grapes and wines that produce purchased at any stage of the chain of production has been processed to a minimum standard and within requirements by law.

IPW has the added benefit of encompassing many of the administrative requirements increasingly sought by international buyers and has become a valuable means to international market access.

The IPW scheme holds little relevance as a direct marketing tool. The majority of South African wine consumers are completely unaware of the scheme and its benefits to the quality and safety of their wine purchase. Increased ecological awareness in general will mean that the IPW status will potentially play a role in purchasing decisions eventually.

Appendix A

Country	Conventional vineyards (ha)	Organic vineyards (ha)	Organic vineyards as a % of Total area under vine
Austria	52 000	564	1.1
Czech Republic	13 000	25	0.2
France	917 000	10 213	1.1
Germany	105 000	1391	1.3
Greece	132 000	1750	1.5
Hungary	131 000	350	0.3
Italy	922 000	50 000	5.4
Portugal	259 000	888	0.34
Spain	1 224 000	21 130	1.7
Switzerland	14 991	209	1.4

Table 1

Vineyards under Organic Management in the Countries of Europe

(Willer & Zanoli 2000).

Appendix B

FRANCE	
Burgundy	Leroy
	Leflaive
	Lafon
	Trapet
	Pierre Morey
	Domaine de la Romanee Conti (partial)
	JM Brocard, Chablis (40% of vineyards)
	Jean-Claude Rateau
	Thierry Guyot
	Dominique et Catherine Derain
Alsace	Zind Humbrecht
	Kreydenweiss
	Ostertag
	Marcel Deiss
	Weinbach
	Pierre Frick
Loire	Eugene Meyer
	Coulee de Serrant (Savennieres)
	Huet (Vouvray)
	Clos Roche Blanche (Touraine)
	Catherine et Pierre Breton
	Clos de Ch. Gaillard
Champagne	Dom de la Sansonniere
	Dom Saint Nicholas (Fiefs Vendeens)
	Jean Pierre Fleury
	Jacques Selosse
	Leclapart
	Erik Schreiber
	Alain Reaut
	Erick de Sousa
Francoise Bedel	
Bordeaux	Raymond-Boulard (in part)
	La Tour Figeac (St Emilion)
Rhone	Falfas (Cote du Bourg)
	Chapoutier
	Marcoux (Chateauneuf)
	Eric Saurel
Provence	Domaine Jacqueline Andre (Chateauneuf)
	Domaine Sainte-Anne (Bandol)

Table 1
Selected biodynamic producers in France

Appendix C

Biodynamic Preparations – ‘Medicine for the Earth’

Preparation	Contents	Application
500	Cow manure fermented in a cow horn, which is then buried over winter in the soil.	Sprayed on the soil at a rate of 60g/ha in 34 litres of water
501	Ground quartz (silica) mixed with rain water and packed in a cow's horn, buried in spring and dug up in autumn.	Sprayed on the vines and cover crops
502	Flower heads of yarrow fermented in a stags bladder	Applied to compost along with preparations 503 – 507. Together these control the breakdown of the manures and compost, helping to make trace elements more available to the plant.
503	Flower heads of camomile fermented in the soil.	Applied to compost
504	Stinging nettle tea	Applied to compost. Nettle tea is sprayed on low vigour or weak vines.
505	Oak bark fermented in the skull of a domestic animal.	Applied to compost
506	Flower heads of dandelion fermented in cow mesentary	Applied to compost
507	Juice from Valerian flowers	Applied to compost
508	Tea prepared from Horsetail plant (Equisetum)	Used as a spray to counter fungal diseases
* All preparations are diluted and then activated or energized by a special stirring process known as ‘dynamisation’		

Table 1
The different biodynamic preparations
Source : Goode, 2003a:26

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